Dec 11th, 3:40 PM - 5:20 PM

Migration of juvenile American eels through 2 power generating stations in the St-Lawrence system

Jean Caumartin
Environment, Hydro-Quebec, Montreal

Denis Desrochers
Milieu inc, Laprairie, Quebec

John Sana
Environment, Ontario Power Generation, Cornwall

Andrew Weinstock
Environment, New York Power Authority, White Plains

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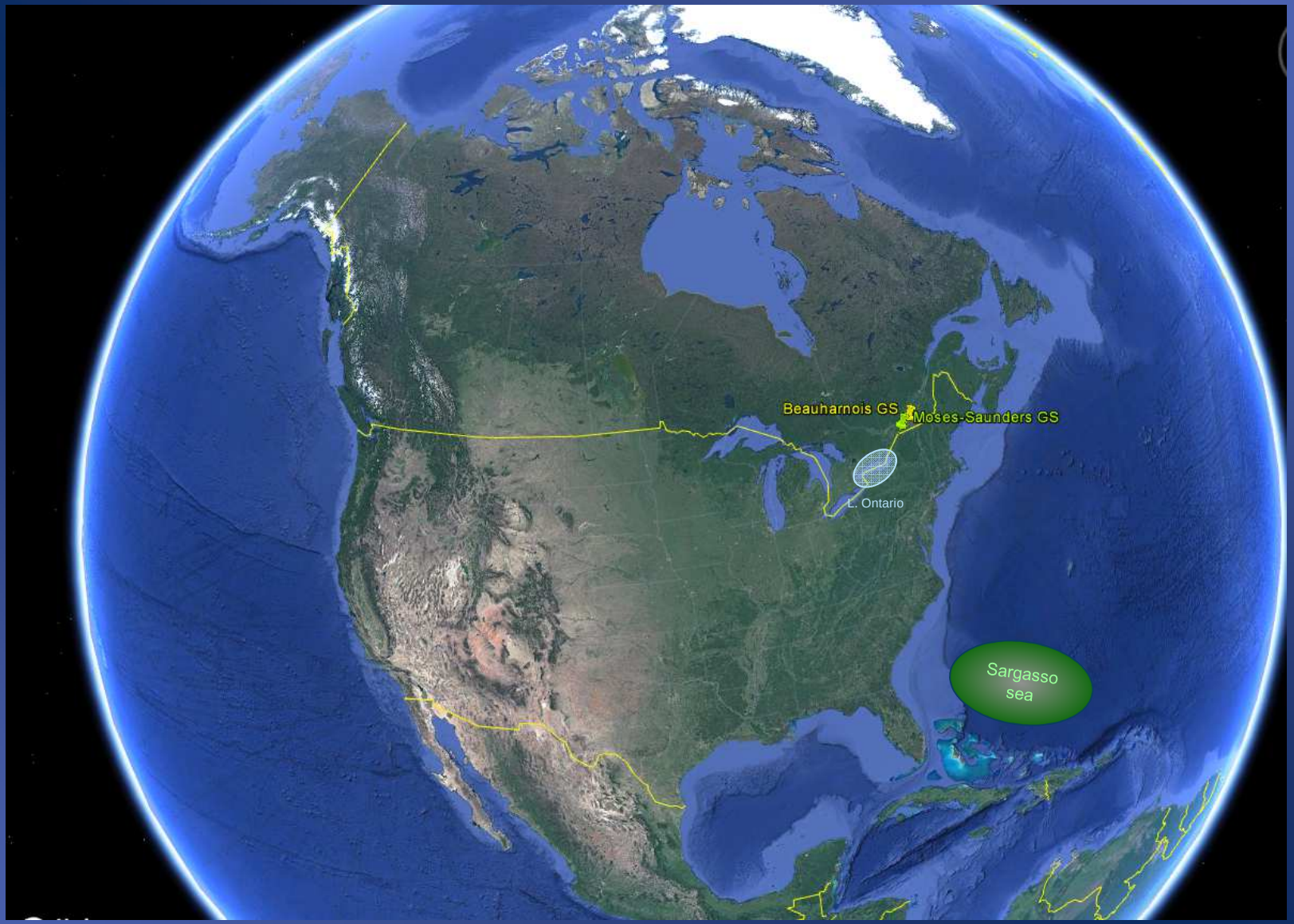
Jean Caumartin, Hydro-Québec - Environment
Denis Desrochers, Milieu inc.
Dave Stanley, Ontario Power Generation
John Sanna, Ontario Power Generation
Andrew Weinstock, New York Power Authority

Where ?



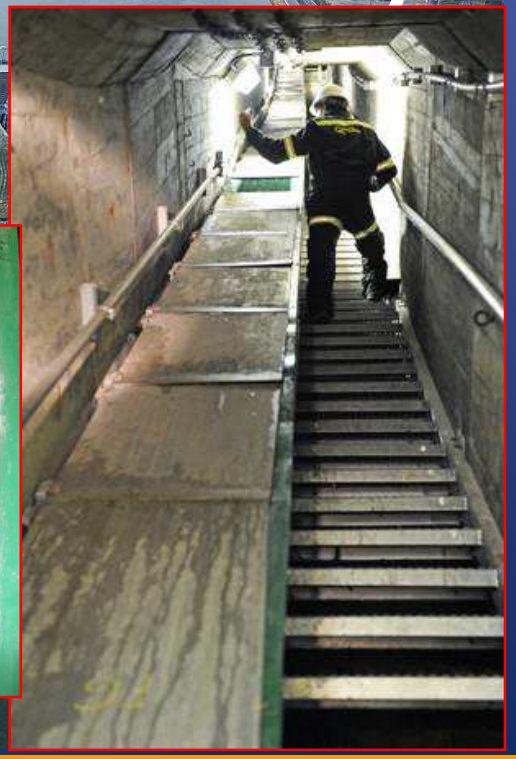
Where ?

Where ?

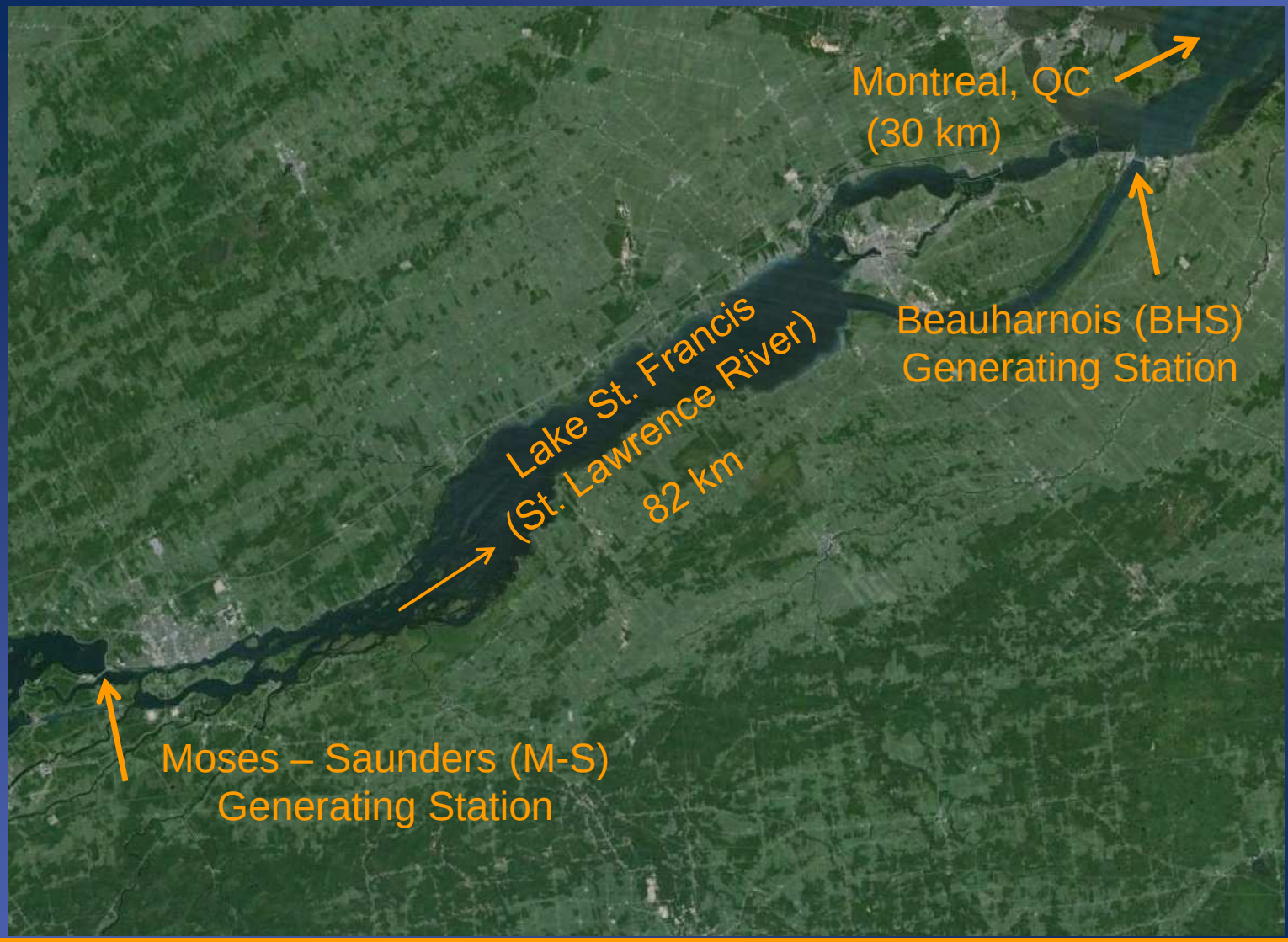
The Fishways

Right side
Operational in 2004)

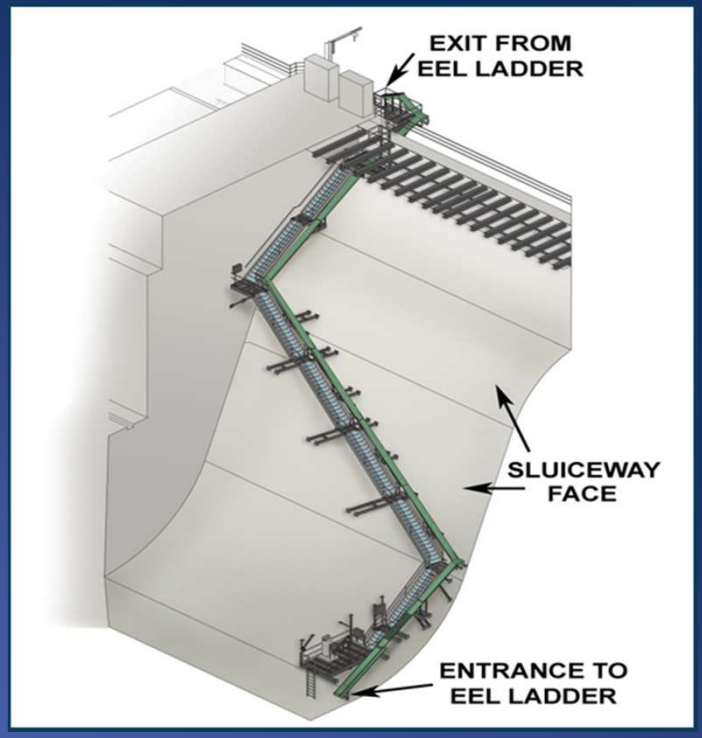
Left side
Operational in 2002)



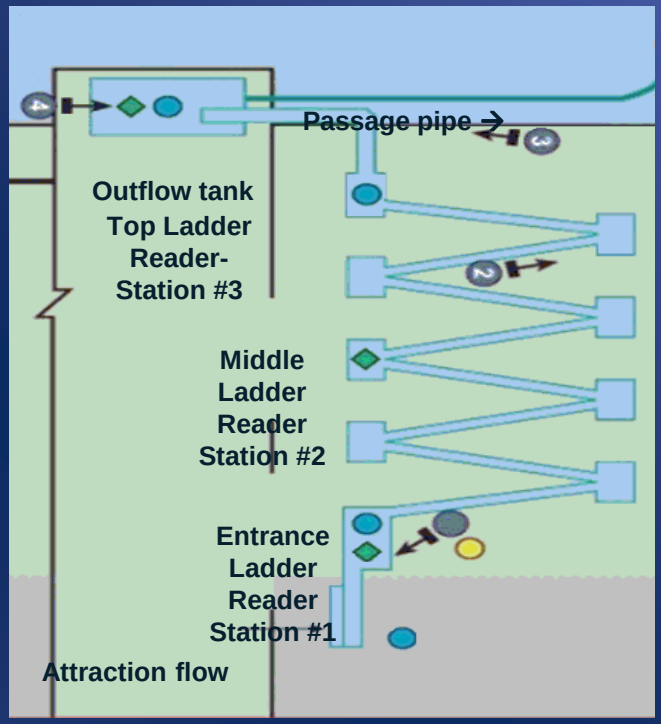
From Beauharnois to Moses Saunders



Moses-Saunders Eels Passage Facilities



Robert Moses G.S
New York Power Authority (NYPA)



Robert H. Saunders GS
Ontario Power Generation (OPG)

Context

- **The Fishways**
  - BHS: June 19 to October 15 (or more if eels)
  - OPG: June 15 to October 15
  - NYPA: July 1 to October 31
  - Eels counted with an electronic counter
- **Counters checked by manual counts**
  - BHS every week up to 500 eels measured in one day, once every 2 years eels sacrificed for age (length - age key)
  - OPG & NYPA: 15 eels per week measured and sacrificed for age

Why?

- **Objectives of Study:**
  - Is the habitat between Beauharnois GS and Moses - Saunders GS actively used or it is only a highway/stopover to Lake Ontario?
  - Is the distribution of eels at Moses-Saunders GS dependent on length or weight?

Beauharnois to Moses-Saunders

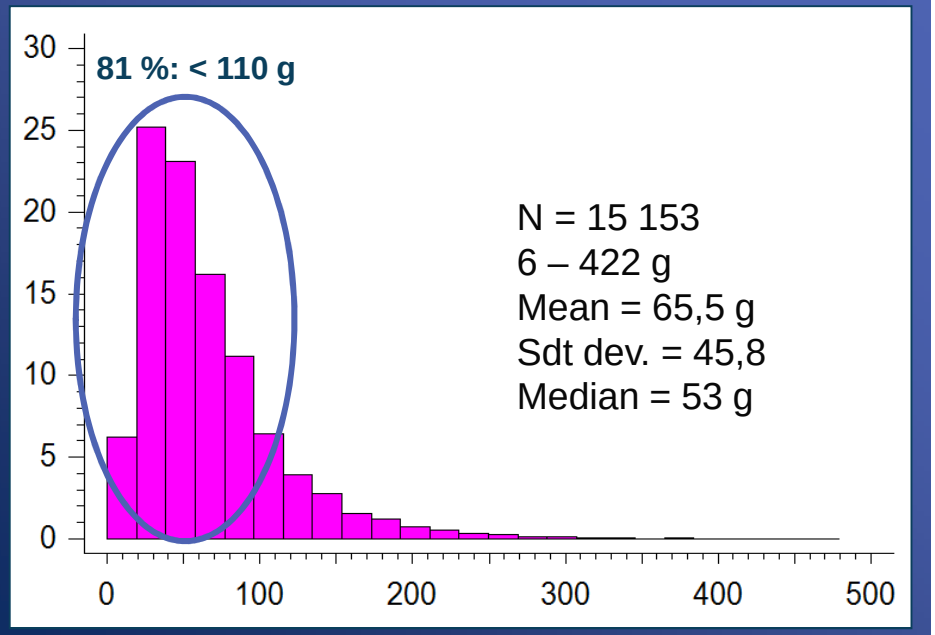
- **2011 – 2015, 15549 elvers were tagged**
- **Biomark Pit tags**
  - Full Duplex
  - 134.2 KHz
  - 0.102 g
  - 2.07 x 12.5 mm

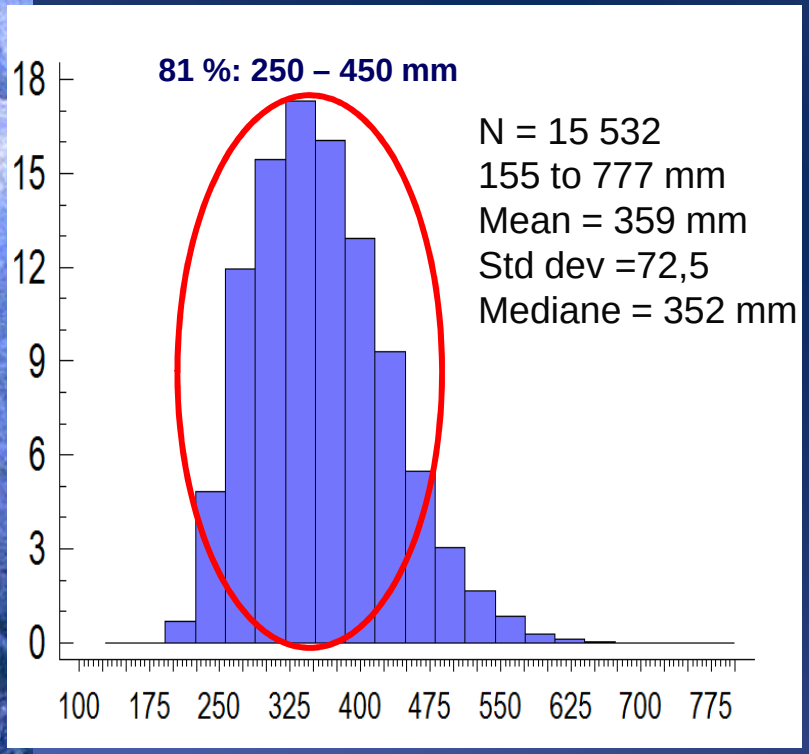
- **Up to 2017, 6322 eels from Beauharnois detected at Moses-Saunders fishways**
- **Some 690 of these eels collected and measured during the counters verification process at Moses - Saunders GS**

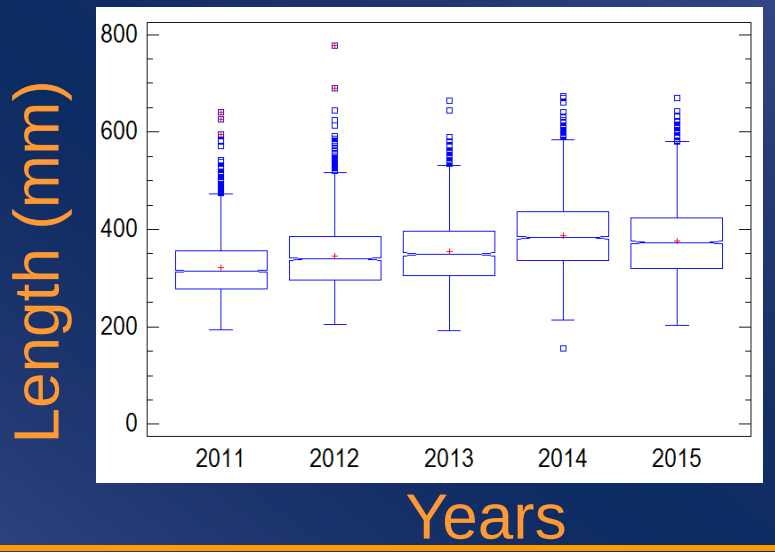
Beauharnois –Moses-Saunders 2011-2017

Year tagged →	2011		2012		2013		2014		2015		Total	
Nb tagged →	2138		3492		2994		3480		3445		15549	
Year observed ↓	Nb	%	Nb	%	Nb	%	Nb	%	Nb	%		
2011	231	10.8									231	
2012	505	23.6	209	6.0							714	
2013	155	7.2	369	10.6	159	5.3					683	
2014	138	6.5	549	15.7	539	18.0	541	15.5			1767	
2015	38	1.8	170	4.9	400	13.4	783	22.5	393	11.4	1784	
2016	3	0.1	28	0.8	76	2.5	223	6.4	550	16.0	880	
2017	1	0.05	1	0.03	11	0.4	45	1.3	205	6.0	263	
Total	**1071**	50.1	**1326**	38.0	**1185**	39.6	**1592**	45.8	**1148**	33.3	**6322**	**40,7%**

Results

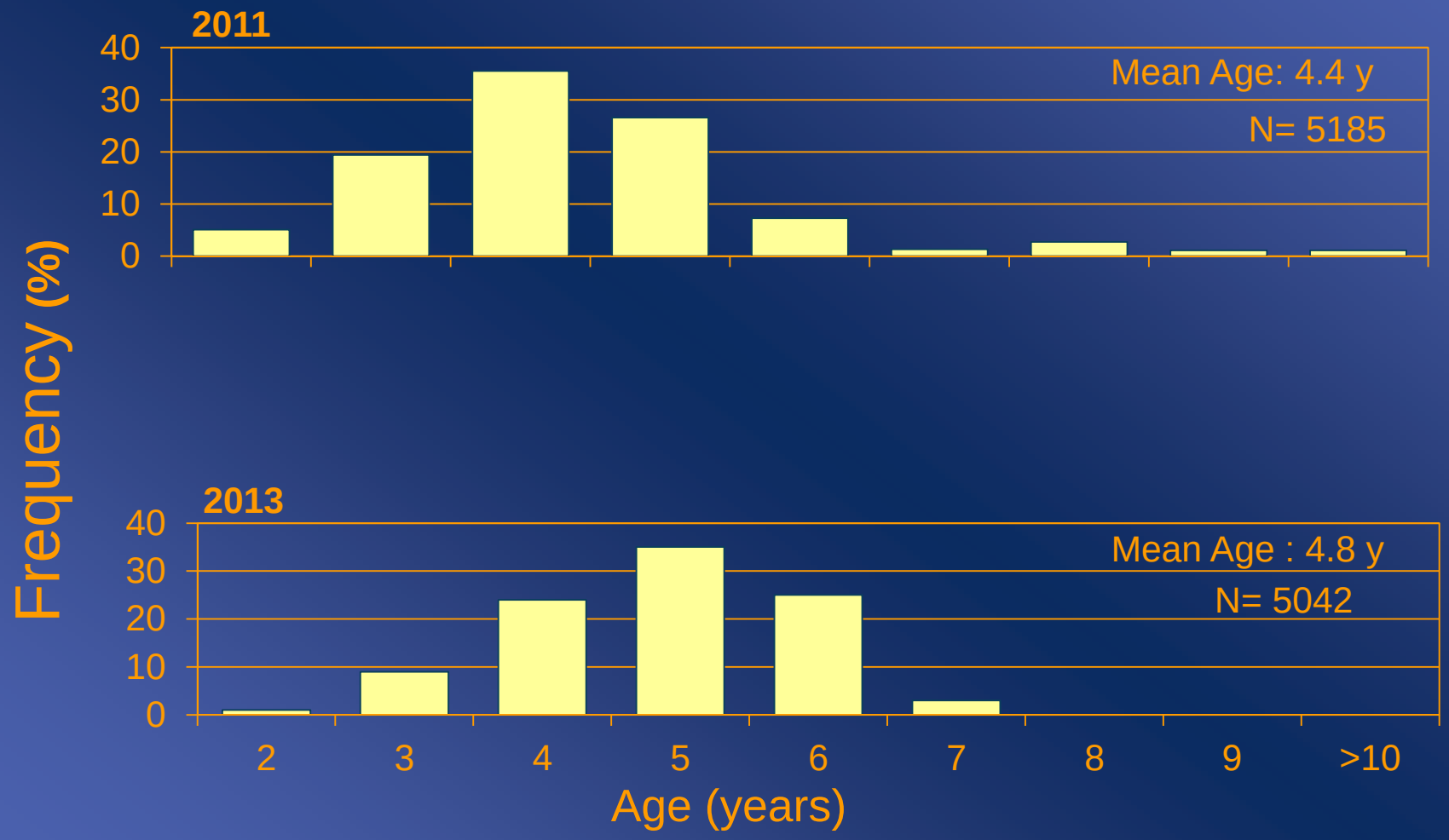

81 %: < 110 g
N = 15 153
6 – 422 g
Mean = 65,5 g
Sdt dev. = 45,8
Median = 53 g
Frequency
Weight (g)


81 %: 250 – 450 mm
N = 15 532
155 to 777 mm
Mean = 359 mm
Std dev =72,5
Mediane = 352 mm
Frequency
Length (mm)

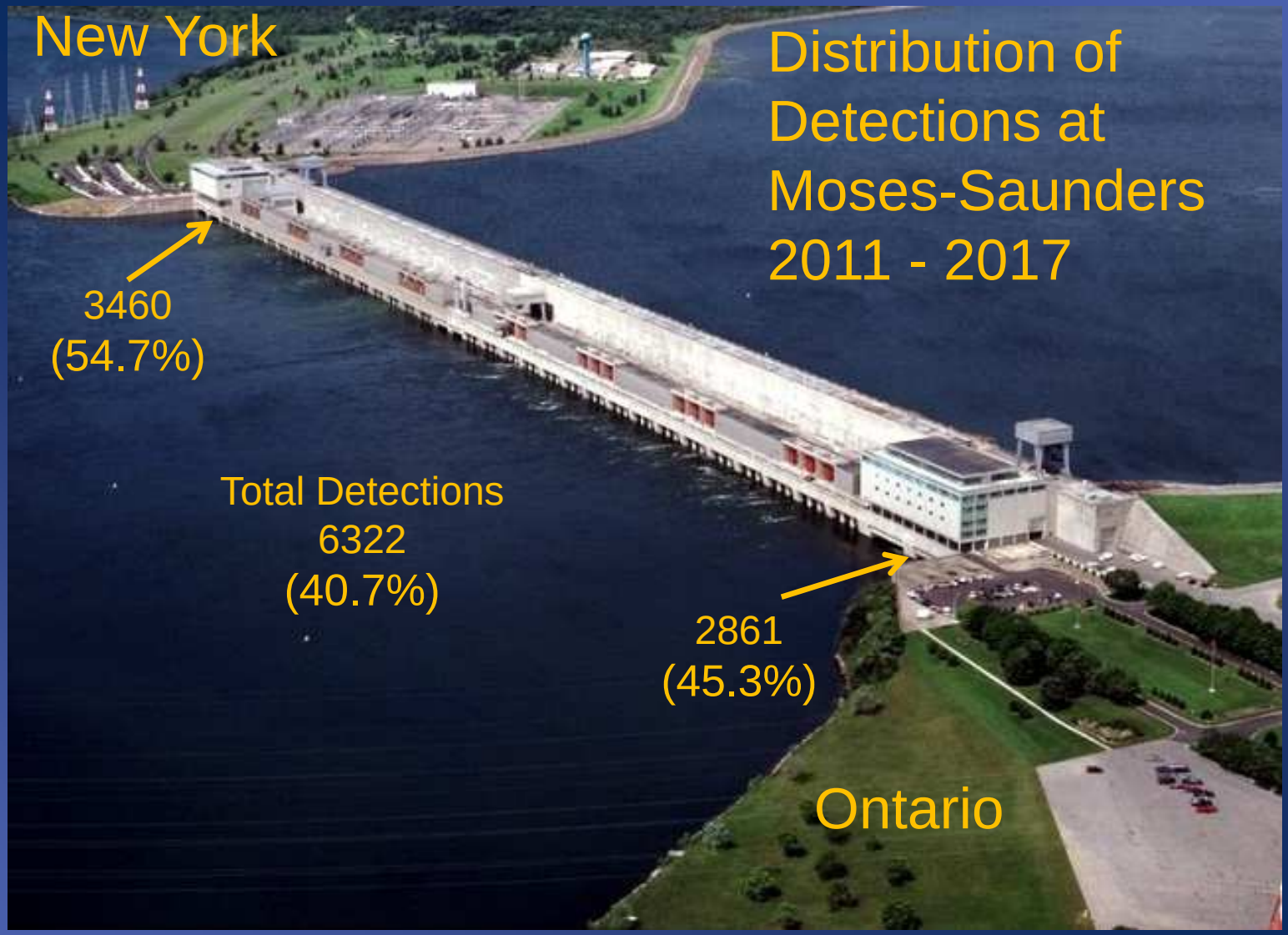

Length (mm)
Years

Things to know

- **From previous study:**

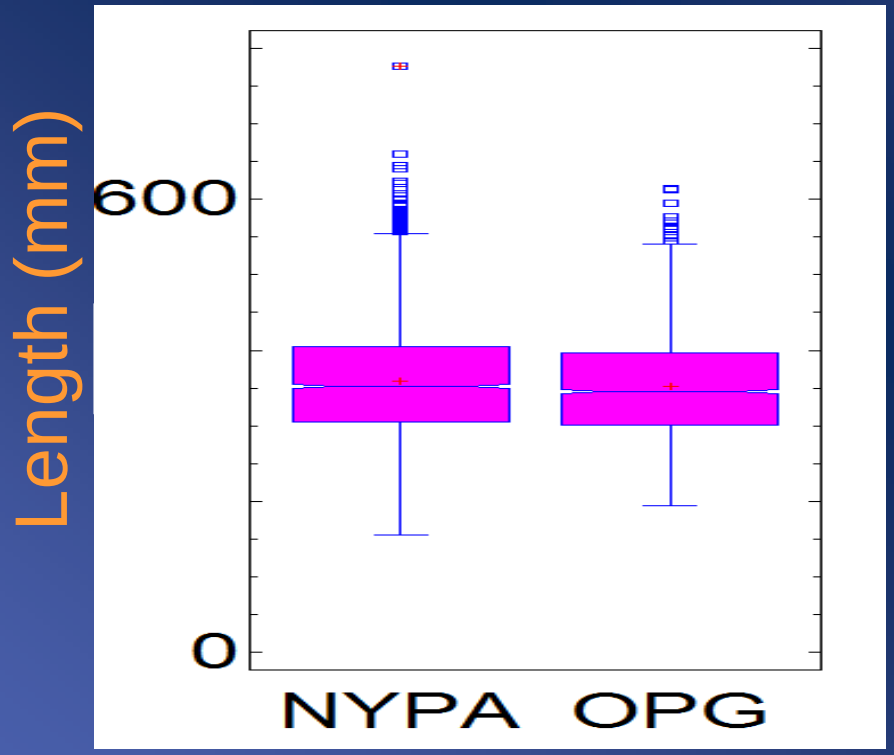


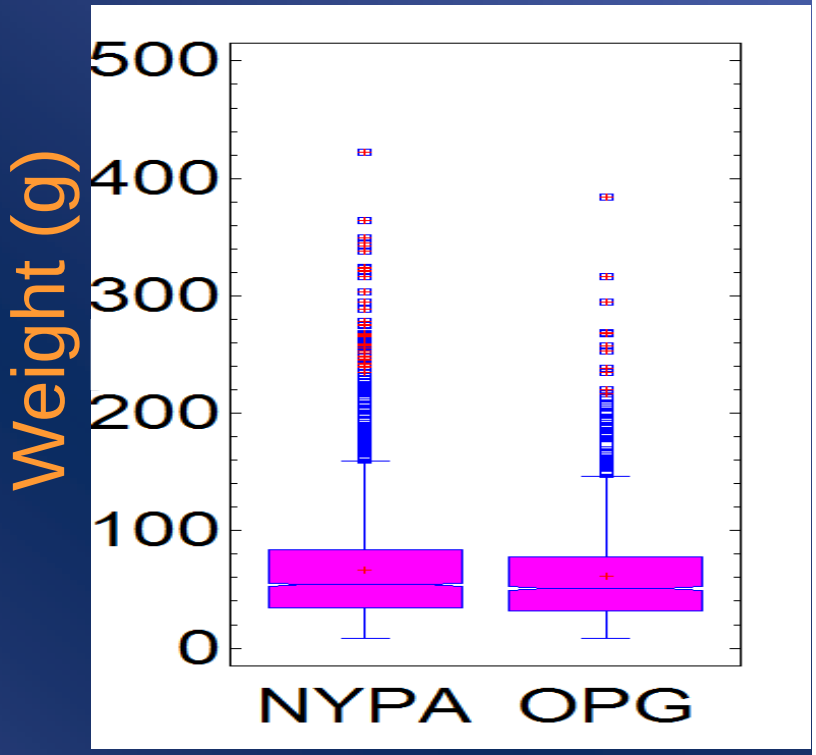
Results


New York
Distribution of Detections at Moses-Saunders 2011 - 2017
3460
(54.7%)
Total Detections
6322
(40.7%)
2861
(45.3%)
Ontario

Results

- In the end no difference





Results

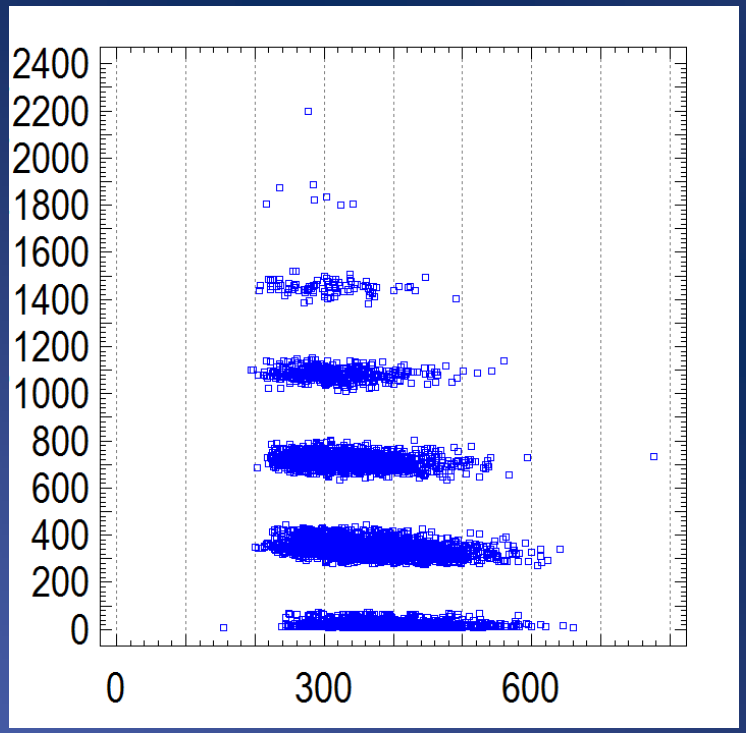
- **Within 3 years ± 40% observed at M-S**
- **Quite impressive swimming speed for those supposedly bad swimmers**

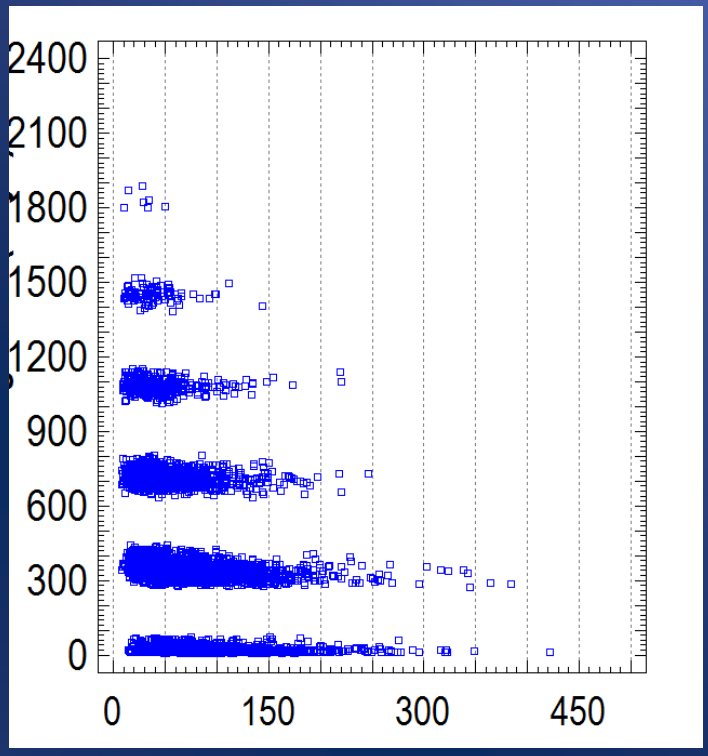
Year tagged at BHS	Observed at M-S (%)	Nbr of year (n)
1	9.9	5
2	17.7	5
3	9.9	5
4	2.8	4
5	0.50	3

Tagged & observed	Average (days)	Min	Max
2011	23.0	8	71
2012	21.4	5	65
2013	18.1	6	57
2014	17.5	7	70
2015	18.2	8	109

Results

- **Are the tallest ones the fastest?**
- **Are the heaviest ones the fastest?**

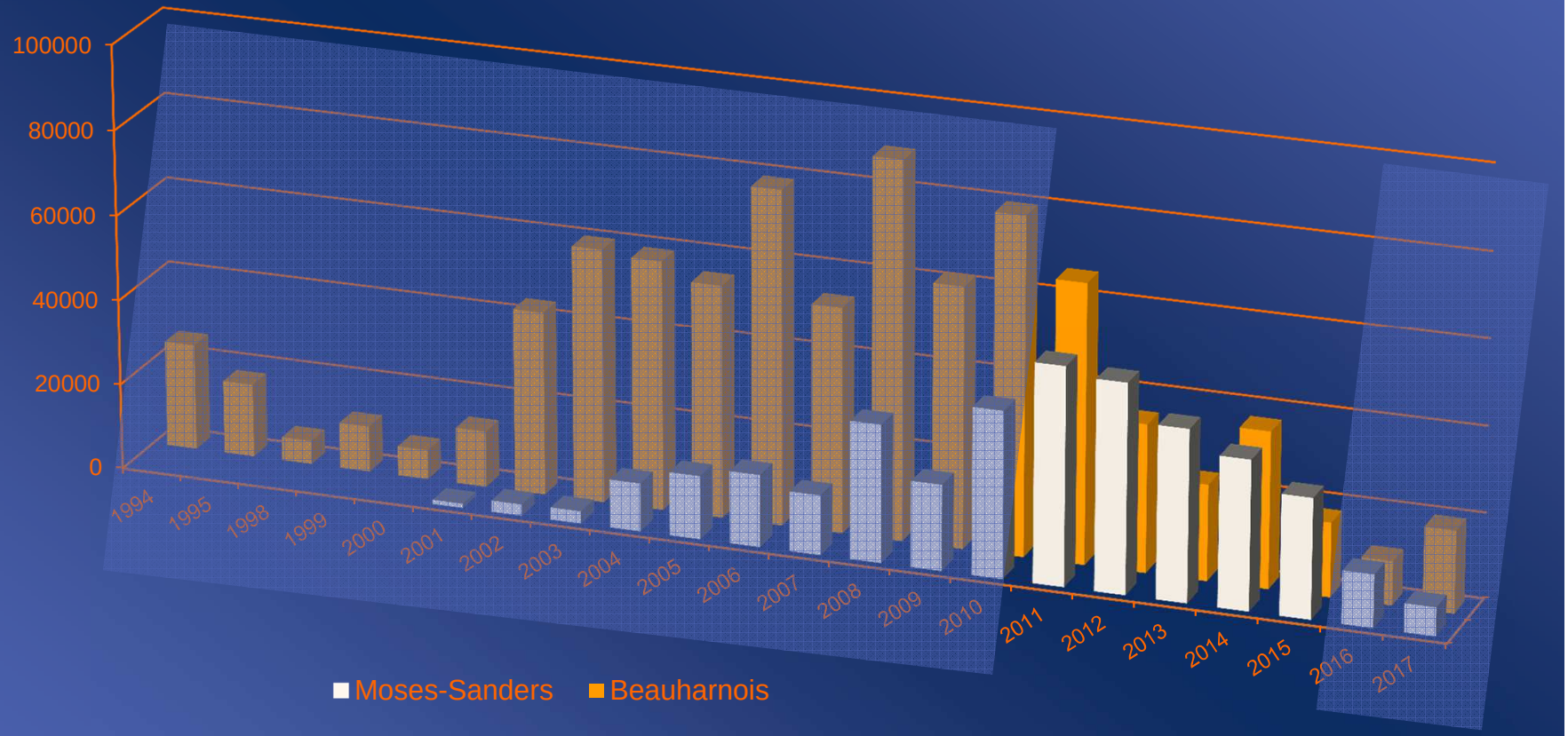




Results

- 690 of the tagged eels were measured at Moses-Saunders
- Most were observed and measured the same day, but 60 explored many entrances, 22 the same night and the longest was 2 years
- During the time in Lake St-Francis they grew at about 26 mm a year

Abundance of eel in Beauharnois and Moses-Saunders fishways



Conclusion

- **After 7 years, ± 41% of tagged eels detected at Moses – Saunders GS**
  - 50% of 2011 tagged cohort detected in 7 years
  - ± 40% of eels are seen within 3 years
  - About 10% detected the same year of tagging
- **60% stayed in L. St-Francis, died or moved out**
- **Both fishways at Moses-Saunders are used in near equal proportion**
  - No real difference in length or weight
- **Some move fast: 82 km in 5 days**

Questions ?

Thanks to Ron Threader and Scott Ault: Kleinschmidt Associates